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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/961,378	09/25/2001	Dimitrii Stepanov	P 283718 S80147962:MHK	5480

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EXAMINER	
CONNELLY CUSHWA, MICHELLE R	
ART UNIT	PAPER NUMBER
2874	

DATE MAILED: 10/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/961,378	STEPANOV ET AL.	
	Examiner	Art Unit	
	Michelle R. Connelly-Cushwa	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,5 and 7-21* is/are rejected.

7)☒ Claim(s) *3 and 6* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 September 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

Applicant's Amendment filed August 22, 2003 has been fully considered and entered.

Claim Rejections - 35 USC § 103

The indicated allowability of claims 8-10 is withdrawn in view of the newly discovered reference(s) to Poladain et al. (WO 99/67664). Rejections based on the newly cited reference(s) follow.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 4, 5 and 7-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Poladian et al. (WO 99/67664).

Regarding claims 1, 4, 8, 15, 17 and 18; Poladian et al. discloses a method of reducing systematic errors (see page 3, lines 17-30) in grating writing in an optical waveguide (see the abstract and Figure 1), the method comprising the steps of:

- controlling the interferometric arrangement of the writing apparatus and the residence time of the writing beam on the fiber to achieve desired spectral characteristics (the Bragg wavelength and the strength of the grating, see page 3, lines 6-16);

- writing a complete test grating (initial portion of the grating structure) experimentally in a first portion of a first waveguide according to the theoretical test grating structure design using a grating writing arrangement (see the abstract and Figure 1);
- measuring the actual spectral characteristics (spectral reflectance response) of the complete test grating structure (initial portion of the grating structure);
- reconstructing an actual design of the complete test grating structure from the actual spectral characteristics (utilizing the parameters to alter the characteristics of a subsequently written portion of the grating structure to provide for an improved form of the grating structure, where the improved form is also tested/measured, see the abstract); and
- writing a compensated grating structure using the same grating writing arrangement in a different portion of the first waveguide using a compensated design based on a comparison of the initial design with the actual design of the complete test grating;
- wherein the compensated grating structure is based on a different theoretical grating structure (the compensated design) than the theoretical test grating structure;
- wherein the step of measuring (testing) the actual spectral characteristics may comprise measuring the actual spectral

characteristics of the complete test grating (initial portion of the grating structure) from both ends thereof (see page 4, lines 23-26); and

- wherein a processing means (analyzer, 16, and computer, 17) are arranged and used to control the writing of the grating structure based on a theoretical grating design and compensation data obtained from the arrangement to compensate for systematic errors.

Poladian et al. does not specifically state that the initial interferometric arrangement for writing the initial portion of the grating structure is numerically designed, however, the initial interferometric arrangement must inherently be numerically determined for a desired wavelength, based on the well known relationship between the desired Bragg wavelength and the period of the grating to be written, thereby calculating an interferometric arrangement for achieving the necessary period for the grating. Therefore, one of ordinary skill in the art would have found it obvious to numerically design the initial portion of the grating structure by calculating the necessary grating period for the desired Bragg wavelength and the initial interferometric arrangement to achieve the calculated period.

Regarding claims 2, 5, 7, 9 and 10; Poladian et al. teaches all of the limitations of claims 2, 5, 7, 9 and 10 as applied above, except for specifically stating that an inverse scattering problem based on the measured actual spectral characteristics is solved; that the comparison of the actual with the initial numerical design comprises subtracting deviations of the actual from the numerical design from the numerical design to form the compensated design; that the comparison of the actual with the initial numerical design

comprises multiplying the theoretical test grating function with a ratio of the theoretical test grating function and the actual test grating function; that different weighting factors are used for the different end reconstructions of the complete test grating to form the reconstructed actual design; and that a half-sum of different reconstructions of the complete test grating are used to reconstruct the actual design. Standard mathematical methods for analyzing theoretical values with respect to experimental values to determine a corrected or compensated value include inverse problem solving based on the measured/experimental values in relation to the theoretical values, subtracting measured deviations/differences between measured/experimental and theoretical values from theoretical values, multiplying theoretical values/functions with a ratio of the theoretical values/functions to the measured/experimental values/functions, applying different weighting factors to two measured values, and using a half-sum method to analyze multiple measured values.

One of ordinary skill in the art would have been familiar with standard methods of mathematical analysis for comparing theoretical values/functions to experimental/measured values/functions. Therefore, one of ordinary skill in the art would have found it obvious to solve an inverse scattering problem based on the measured actual spectral characteristics; subtract deviations of the actual from the numerical design from the numerical design; multiply the theoretical test grating function with a ratio of the theoretical test grating function to the actual test grating function; apply different weighting factors to the two measured values from each end of the grating; or use a half-sum method to analyze the two measured values from each end of

the grating to determine a corrected/compensated value and write a compensated grating structure in the invention of Poladian et al., since these are standard methods for mathematical analysis and Poladian et al. does not teach that a specific mathematical technique must be employed to analyze the measured values for the test grating (initial portion of the grating structure).

Regarding claim 11; the steps are repeated (iterated), wherein the compensated design structures takes on the role of the complete test grating structure (initial portion of the grating structure, see the abstract).

Regarding claim 12; Poladian et al. teaches that the steps are repeated (iterated, see the abstract) to write the complete grating structure and that illumination is terminated when a desired value (desired accuracy) is reached (see page 6, lines 1-6).

Regarding claims 13 and 14; the steps of writing the complete test grating (initial portion of the grating structure) and the compensated grating comprise utilizing an interferometer for inducing refractive index changes in a waveguide (fiber, 11) to form the test and compensated grating structures (see the abstract and Figure 1).

Regarding claim 16; On page 4, line 18, through page 6, line 6, Poladain et al. teaches that the analyzer (16) and computer system (17) are used to measure and analyze the spectral information from the test grating structure and that a predicted response can be readily estimated from the knowledge of the previously written values (i.e. most recently measured values) so that a predictor-corrector algorithm can be run in real time. In order for the predictor-corrector algorithm to be run a real time, the

analyzer and/or computer system is required to store the measured compensation data from at least the most recent measurements of a particular grating arrangement.

Regarding claims 19, 20 and 21; Figure 1 discloses a waveguide structure (11) incorporating a grating written by the method taught by Poladain et al.

Allowable Subject Matter

Claims 3 and 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Claims 3 and 6 are allowable over the prior art of record for the reasons stated in the Office action mailed April 23, 2003.

Response to Arguments

Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Any inquiry concerning the merits of this communication should be directed to Examiner Michelle R. Connelly-Cushwa at telephone number (703) 305-5327. The examiner can normally be reached 9:00 AM to 7:00 PM, Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney B. Bovernick can be reached on 703-308-4819. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general or clerical nature should be directed to the Technology Center 2800 receptionist at telephone number (703) 308-0956.

MRCC
Michelle R. Connelly-Cushwa
Patent Examiner
October 9, 2003

AKM ENAYET ULLAH
PRIMARY EXAMINER